



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C12N 15/29, 15/82, 15/56, 15/72, 15/81, 9/24, C07K 14/415, C12N 5/10, 1/19, 1/21, A01H 5/00, A01K 67/027, A23L 3/36, A23G 9/00	A2	(11) International Publication Number: WO 99/06565 (43) International Publication Date: 11 February 1999 (11.02.99)
(21) International Application Number: PCT/CA98/00745 (22) International Filing Date: 31 July 1998 (31.07.98) (30) Priority Data: 08/903,872 31 July 1997 (31.07.97) US (63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US 08/903,872 (CIP) Filed on 31 July 1997 (31.07.97) (71) Applicant (for all designated States except US): ICE BIOTECH INC. [CA/CA]; 75 Allen Street West, Waterloo, Ontario N2L 1E3 (CA). (72) Inventors; and (75) Inventors/Applicants (for US only): HEW, Choy [CA/CA]; 117 Glenmanor Way, Thornhill, Ontario L4J 3A3 (CA). XIONG, Fei [CA/CA]; 8 Avonlea Place, Richmond Hill, Ontario L4B 1N6 (CA). MOFFATT, Barbara [CA/CA]; 110 Mallard Crescent, Waterloo, Ontario N2V 1E4 (CA). GRIF-		FITH, Marilyn [CA/CA]; 75 Allen Street West, Waterloo, Ontario N2L 1E3 (CA). (74) Agent: DEETH WILLIAMS WALL; National Bank Building, Suite 400, 150 York Street, Toronto, Ontario M5H 3S5 (CA). (81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: ANTIFREEZE PROTEINS, DNA AND EXPRESSION SYSTEMS (57) Abstract <p> The winter rye, upon cold-induction or acclimation, produces a family of antifreeze proteins that are similar to pathogen-related proteins. Two of these proteins, both of which are chitinase-like proteins, are cloned using molecular biology techniques and are expressed in bacterial and yeast (<i>Pichia</i>) systems and <i>Arabidopsis thaliana</i>. The recombinant proteins showed both chitinase and antifreeze activities. The invention includes the DNA and protein sequences of the chitinase-like antifreeze proteins, any modifications of the said sequences, the expression of these proteins and their application in agriculture, food industry and medicine. </p>		